

**SPECIFICATION**

**TO WHOM IT MAY CONCERN**

BE IT KNOWN That I, Peter W. Dodge, a citizen of the United States, residing in Birchwood, Barron County, State of Wisconsin, have invented new and useful improvements in CONVERTIBLE FURNITURE FRAME of which the following is a specification.



### **FIELD OF THE INVENTION**

This invention relates to furniture frames, and more specifically to a furniture frame that is convertible between a bed position and a couch position.

### **CROSS REFERENCE TO RELATED APPLICATIONS**

This application claims priority to pending U.S. Provisional Application Serial No. 60/429,660, which was filed on November 27, 2002.

### **STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT**

None

### **REFERENCE TO A MICROFICHE APPENDIX**

None

### **BACKGROUND OF THE INVENTION**

Furniture frames that are convertible between a bed position and a couch position are known in the art. The aforementioned convertible furniture frames allow users to maximize the use of a limited living space such as that of a studio or a small apartment by reducing the space dedicated for the furniture. That is, instead of requiring a space in the apartment dedicated solely for the user's bed and another space in the apartment dedicated solely for the user's couch or sofa, the use of the convertible furniture frame allow the user to eliminate one of the aforementioned dedicated furniture spaces thereby providing the user with increase living space.

Although prior art convertible furniture frames function effectively to provide the user with increase living space, they often lack stability and sturdiness which results in difficulties in their conversion between the bed and couch position. In addition, due to their lack of stability and sturdiness, the aforementioned furniture frames also can be quite troublesome to move from one place to another.

The present invention provides for a furniture frame that is substantially effortless to convert between the bed position and the couch position while further providing for a furniture frame that is also substantially effortless to move or transport to different areas of a living space.

### **SUMMARY OF THE INVENTION**

The present invention is a convertible furniture frame and methods for converting the furniture frame between the couch position and the bed position. The furniture frame includes a backrest section and a seat section with the backrest section comprising a first side and a second side. Each of the sides of the backrest section includes a backrest support member connected thereto for supporting the backrest section on a support surface. Connecting the supporting members to each other is a prop bar which function to guide the movement of the backrest support members in a simultaneous manner. The backrest section also includes at least one wheel rotatably secured to the backrest section,

the at least one wheel allowing a user to effortlessly move the furniture frame from one location to another location.

The seat section comprises a first side and a second side with each of the sides of the seat section having a seat support member secured thereto for supporting the seat section on the support surface. The seat section further includes at least one catch member secured to at least one of the sides of the backrest section with the catch member having at least one notch for engaging a portion of the prop bar therein for supporting the furniture frame in the couch position.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 shows an exploded view of a furniture frame of the present invention;

Figure 2 is a side view showing the furniture frame of the present invention in a bed position;

Figure 3 is a side view showing the furniture frame of the present invention with the front edge of the seat section of the furniture frame being raised;

Figure 4 is a side view showing the protruding members of the seat section of the furniture frame being moved into the groove of the backrest section;

Figure 5 is a side view showing the wheels of the backrest section engaging a support surface;

Figure 6 is a side view showing that the backrest support member and the recess of the seat section being brought into proximity;

Figure 7 is a side view showing the front edge of the seat section being raised to lower the recess; and

Figure 8 shows the furniture frame in a couch position.

Figure 9 is a perspective side view showing an alternative embodiment of the furniture frame of the present invention in a bed position;

Figure 10 is a perspective side view showing the furniture frame of Figure 9 in a couch position;

Figure 11 is a partial exploded view of the furniture frame of Figure 9;

Figure 12 shows a rear view of the furniture frame of Figure 9 in the couch position;

Figure 13 shows a bottom perspective view of the furniture frame of Figure 9 in the couch position;

Figure 14 is a side view showing the furniture frame of Figure 9 in the bed position;

Figure 15 is a side view showing the furniture frame of Figure 14 with a front edge of the seat section of the furniture frame raised from a support surface;

Figure 16 is a side view showing the furniture frame of Figure 9 with the backrest section raised and the prop bar aligned with one of the notches of the catch member;

Figure 17 is a side view showing the engagement of a portion of the prop bar with a first notch of the catch member;

Figure 18 is a side view showing the movement of the prop bar from the first notch of the catch member to the second notch of the catch member;

Figure 19 is a side view showing the backrest section being pull forward towards the seat section so as to set the prop bar in the first notch;

Figure 20 is a side view showing the front edge of the seat section of the furniture frame raised to bring the backrest support member into contact with the support surface;

Figure 21 is a side view showing the front edge of the seat section raised to displace the prop bar from the catch member; and

Figure 22 is a side view showing the lowering of the front end of the seat section to engage the seat support member with the support surface.

### **DESCRIPTION OF THE DRAWINGS**

The present invention comprises a furniture frame 10 convertible between a bed position and a couch position. Figure 1 shows an exploded view of a furniture frame 10 of the present invention comprising a backrest section 11 and a seat section 12. As shown in the embodiment of Figure 1, the backrest section 11 includes a L-shape sidewall 13 having a groove 14 located thereon and a protruding member 15 secured thereto. Backrest section 11 also includes a backrest support member 16 swingably secured thereto and a wheel 17 rotatably secured thereto, the backrest support member 16 and wheel 15 function to support the backrest section 11 on a support surface such as a floor.

Although the backrest support member 16 is shown in Figure 1 secured to the side 13 of the backrest section 11, alternative embodiment of the present invention can include the backrest support member 16 secured to other regions on the backrest section 16. In addition, although one wheel 17 is shown in the embodiment of Figure 3, alternative

embodiments of the present also can include the use of a backrest section 11 having a plurality of wheels rotatably secured thereto.

Also note that while only one side 13 of the backrest section 11 is shown in Figure 1, both sides of the backrest section in the embodiment of Figure 1 can include a protruding member secured thereon, a groove located thereon and a wheel rotatably secured thereto.

Backrest section 11, as shown in the embodiment of Figure 1, further includes a connecting rod or prop bar 18 securely attached to the backrest support member 16. The connection of the backrest support member 16 to the prop bar 18 guides the swinging movement of support member 16 of the backrest section 11.

Although the backrest support member 16 of the present invention is shown in Figure 1 secured to the side of the backrest section 11, alternative embodiment of the present invention may have the backrest support member 16 secured to different locations on the backrest section 11. Alternative embodiments of the present also may include the use of a backrest section 11 comprising more or less than two wheels, two grooves, and two support members.

As shown in Figure 1, the seat section 12 of the present invention includes a first side 19 and a second side (not shown) with each of the sides of the seat section having a slot 20 located thereon for receiving the protruding member 15 located on the sides of the



backrest section 11 to thereby allow the backrest section 11 to rotatably connect to the seat section 12. Also included on each side of the seat section 12 is a recess 21 for engaging an end 18A of the prop bar 18, a protruding member 22 for engaging the groove of the backrest section 14, and a seat support member 23 secured to each side of the seat section 12 for supporting the seat section 12 on the support surface.

Referring to Figure 2, Figure 2 is a side view showing the furniture frame 10 of the present invention in a bed position. The bed position is characterized by the backrest section 11 and the seat section 12 of the furniture frame 10 positioned in a condition so as to form a flat support surface for supporting a cushion or a mattress such as a futon mattress on the furniture frame 10. As shown in Figure 2, in the bed position the support member 16 of the backrest section 11 and the support member 23 of the seat section 12 support the furniture frame 10 on the support surface 24. In the bed position, the wheel 17 of the backrest section 11 is also in an up position so as not to engage the support surface 24.

Figure 3 is a side view showing the furniture frame 10 of the present invention with a front end 25 of the seat section 12b raised in the start of the process of converting the furniture frame 11 from the bed position to the couch position.

Referring to Figure 4, Figure 4 is a side view showing the protruding member 22 of the seat section 12 being moved into the groove 14 of the backrest section 11. During this process, the protruding member 15 of the backrest section is free to slide in slot 20 of the

seat section 12. The recess 21 on the side 19 of the seat section 12 and the protruding member 15 of the backrest section 11 make up the hinge between the seat section 12 and the backrest section 11. The movement of the seat section 12 causes the protruding member 22 of the seat section 12 to lock and unlock while in the groove 14 of the backrest section 11 and provides the leverage to raise the backrest section 11.

Figure 5 is a side view showing the wheel 17 of the backrest section 11 engaging the support surface 24 as the backrest section 11 is raised. Once the wheel 17 engages the support surface 24, the furniture frame 11 may be rolled to a desired location such as away from a wall or to different locations in a room. As shown in Figure 5, after the wheel 17 engages the support surface 24, the support member 16 of the backrest 11 is then moved downward closer to the support surface 24.

Figure 6 is a side view showing that the backrest support member 16 and the recess 21 of the seat section 12 are brought into proximity of each other as a result of the friction between the support surface 24 and the bottom of the backrest support member 16 and the action of the wheel 17.

Figure 7 is a side view showing the front end 25 of the seat section 12 raised to lower the recess 21 of the seat section 12 to allow the recess 21 of the seat section 12 to receive a portion of the prop bar 18.

Figure 8 shows the lowering of the front end 25 of the seat section 12 leads to the recess 21 of the seat section 12 trapping the prop bar 18 therein to thereby maintain the furniture frame 10 in the couch position. The trapping of the prop bar 18 to the recess 21 of the seat section 12 results in the support member 16 of the backrest section 11 positioned so as not to engage the support surface 24.

Referring to Figures 9-10, Figure 9 is a perspective side view showing an alternative embodiment of the furniture frame 26 of the present invention in the bed position. The bed position is characterized by a backrest section 27 and a seat section 28 of the furniture frame 26 configured in a condition so as to form a flat support surface for supporting a cushion or a mattress such as a futon mattress (not shown) on the furniture frame 26.

Figure 10 is a side view of the furniture frame 26 of the present invention in a couch position. The couch position is characterized by the backrest section 27 and the seat section 28 of the furniture frame 26 disposed at an angle to each other, and more specifically, being disposed at an angle of less than 180 degrees with respect to each other.

Referring to Figure 11, Figure 11 shows an exploded partial view of the furniture frame 26 of the present invention. Although only one side of the backrest section 27 is shown

in Figure 3, it is intended that both sides of the backrest section 27 in the embodiment of Figure 3 contains similar corresponding parts.

As shown in the embodiment of Figure 11, the backrest section 27 includes a L-shape sidewall 29 having a protruding member 30 secured thereon. Backrest section 27 also includes a backrest support member 32 swingingly secured thereto and a wheel 31 rotatably secured thereto, the backrest support member 32 and wheel 31 functions to support the backrest section 27 on a support surface such as a floor.

Although the backrest support member 32 is shown in Figure 11 secured to the side 29 of the backrest section 27, alternative embodiment of the present invention can include the backrest support member 32 secured to other regions on the backrest section 32. In addition, although one wheel is shown in the embodiment of Figure 11, alternative embodiments of the present also can include the use of a backrest section 27 having a plurality of wheels rotatably secured thereto.

Backrest section 27, as shown in the embodiment of Figure 11, further includes a connecting rod or prop bar 33 securely attached to the support member 32. The connection of the support member 32 to the prop bar 33 guides the movement of support member 32 of the backrest section 26.

Seat section 28, as shown in the embodiment of Figure 11, includes a seat support member 36 secured thereto for supporting the seat section 28 on the support surface. Seat section 28 further includes a sidewall 34 having a slot 35 located thereon for receiving the protruding member 30 of the backrest section 27. The mating engagement between the protruding member 30 of the backrest section 27 and the slot 35 of the seat section 28 allows for the rotatable connection between the backrest section 27 and the seat section 28.

The seat section 28, as shown in the embodiment of Figure 11, also includes a catch member 37 secured thereto, catch member 37 having a first notch 38 and a second notch 39 for supporting a portion of the prop bar 33 therein when the furniture frame 26 is in the couch position so as to maintain the furniture frame 26 in the couch position.

Although catch member 37 is shown in the embodiment of Figure 11 as having two notches 38 and 39, alternative embodiments of the present invention can comprise catch members having as few as one to a plurality of notches thereon to provide the furniture frame 26 with great adjustability, that is, the ability to adjust the backrest section 26 of the furniture frame 26 to more or less of an upright position when the furniture frame 26 is in the couch position.

Referring to Figures 12 and 13, Figure 12 shows a rear view and Figure 13 shows a bottom perspective view of the furniture frame 26 of the present invention in the couch position. It is noted that the embodiment of Figures 12 and 13 show the furniture frame

26 having catch members 37 and 37A located on the sides of the seat section 28. Figure 12 shows catch member 37 having notches 38 and 39 for receiving a first end 40A of a prop bar 40 and catch member 37A having notches 38A and 39A for receiving a second end 40B of prop bar 40 when the furniture frame 26 is in the couch position.

Figures 14 -18 show the conversion of furniture frame 26 of the present invention from the bed position to the couch position. Referring to Figure 14, Figure 14 is a side view showing the furniture frame 26 in the bed position. In the bed position the backrest support member 32 of the backrest section 27 and the support member 36 of the seat section 28 along with at least one wheel 31 function to cooperatively support the furniture frame 26 on the support surface 41. It is noted that in the bed position, the backrest support member 32 is shown in Figure 14 engaging a stop member 27A located on the backrest section 27, stop member 27A functioning to limit further movement of the backrest member 32 when the furniture frame 26 is in the bed position.

Figure 15 is a side view showing furniture frame 26 with a front edge 42 of the seat section 28 raise from the support surface 42 in the start of the process of converting the furniture frame 26 from the bed position to the couch position. The raising of the front edge 42 of the seat section 28 causes the lifting of the backrest section 27. The continual lifting of the backrest section 27 eventually results in the displacement of the backrest support member 32 from the support surface 41.

It is noted that a feature of the present invention is that once the backrest support member 32 is displaced from the support surface 41, support for the furniture frame 26 on the support surface 41 is primarily through wheel 31. The aforementioned condition allows furniture frame 26 to be effortlessly be rolled to a desired location such as away from a wall or to different locations in a room in a similar fashion to that of a wheelbarrow.

Referring to Figure 16, once displaced from the support surface 41 the backrest support member 32 along with the prop bar 44 that is secured thereto is free to swingingly move closer to the catch member 43 until the prop bar 44 is aligned with one of the notches 45 and 46 of the catch member 43. Once the prop bar 44 is aligned with one of the notches 45 and 46 of catch member 43, the front edge 42 of the seat member 28 is lowered to allow for one of the notches 45 and 46 of the catch member 43 to receive the prop bar 44.

Figures 17-20 illustrates the various positions with the elongated slot 25 and protruding member 30 eliminated for purposes of clarity. Referring to Figure 17, Figure 17 shows the engagement of a portion of the prop bar 44 with a first notch 45 of catch member 43. The engagement of the prop bar 44 with notch 45 functions to trap the furniture frame 26 in the couch position to prevent further movement of the backrest section 27 with respect to the seat section 28.

Referring to Figure 18, Figure 18 is a side view showing the movement of the prop bar 44 from the first notch 45 of catch member 43 to the second notch 46 of catch member 43.

As shown in Figure 18, movement of the prop bar 44 from the first notch 45 to the second notch 46 increases the upright position of the backrest section 27 of the furniture frame 26 with respect to seat section 28 when the furniture frame 26 is in the couch position. It is noted that when prop bar 44 engages notches 45 and 46, the weight of the backrest section 27 further supports in the securement of the prop bar 44 to the notches 45 and 46 of the catch member 43.

Referring to Figures 19 - 22, in the conversion of the furniture frame 26 from the couch position to the bed position, the user pulls the backrest section 27 forward towards the seat section 28 to set the prop bar 44 in the first notch 45 of the catch member 43 if the prop bar 44 is not already engaging the first notch 45.

The front end 42 of the seat section 46 is then raised, causing the backrest support member 32 to come into contact with the support surface 41. As shown in Figure 21, once the backrest support member 32 is in contact with the support surface 41, further raising/lifting of the seat section 28 results in the disengagement of the prop bar 44 from the catch member 43.

Disengagement of the prop bar 44 from the catch member 43 results in a partial transfer of support of furniture frame 26 to the backrest support member 32. As shown in Figure 22, once the prop bar 44 has been displaced from the notch 45 of the catch member 43, the front end 42 of the seat section 28 is then lowered to permit the seat support member



36 to engage the support surface 41 to finalize the conversion of the furniture frame 26 to the bed position.

A feature of the present invention is that the above conversion of the furniture frame 26 between the bed position and the couch position can be accomplished with the furniture frame 26 being position substantially against a wall surface. That is, the “wall-hugging” feature of the furniture frame 26 of the present invention allows the backrest section 27 of the furniture frame 26 to be place substantially against a wall surface when the furniture frame 26 is in the sofa configuration and remain against the wall even when the furniture frame 26 is converted to the bed position. The aforementioned is accomplished by the front operating feature of the furniture frame 26, that is, due to the fact that the furniture frame 26 can be convertible between the bed position and the couch position solely from the front edge 42 of the seat section 28 of the furniture frame 26.

The present invention, as shown in the embodiment of Figures 1-8, include a method of converting a furniture frame 10 from a bed position to a couch position comprising the steps of: lifting a front end 25 of a seat section 12 of the furniture frame 10 in the bed position; moving the protruding member 22 located on a side 19 of the seat section 12 into the groove 14 located on a side 13 of the backrest section 11; bringing the backrest support member 16 and the recess 21 located on the side 19 of the seat section 12 into proximity, raising the front end 25 of the seat section 12 to allow the backrest support member 16 and the a portion of the prop bar 18 to engage the recess 21 of the seat section

12; and lowering the front end 25 of the seat section 12 to trap the prop bar 18 to the recess 21 of the seat section 12 to maintain the furniture frame 11 in the couch position.

The present invention, as shown in the embodiment of Figures 1-8, further includes method of converting a furniture frame 10 from the couch position to the bed position comprising the steps of: raising a front end 25 of the seat section 12 of the furniture frame 10 in the couch position; removing the prop bar 18 from the recess 18 of the seat section 12; moving the backrest support member 16 away from the recess 21 of the seat section 21; removing the protruding member 22 of the seat section 12 from the groove 14 of the backrest section 11; and lowering the front end 25 of the seat section 12 of the furniture frame 10 into the bed position.

The present invention, as shown in the embodiments of Figures 9-22, also includes a method of converting a furniture frame 26 from the bed position to the couch position comprising the steps of: (1) lifting the front edge 42 of the seat section 28 of the furniture frame 26 in the bed position; (2) bringing the prop bar 44 connected to at least one backrest support member 32 and the notch 45 of the catch member 43 located on the side of the seat section 28 into proximity; (3) raising the front edge 42 of the seat section 28 to allow the backrest support member 32 and a portion of the prop bar 44 to engage the notch 45 of the seat section 28; and (4) lowering the front edge 42 of the seat section 28 to trap the prop bar 44 to the notch 45 of the seat section 28 to maintain the furniture frame 26 in the couch position.

The above method can also include the step of (5) moving the prop bar 44 between the first notch 45 and the second notch 46 of the seat section 28 to adjust the upright position of the furniture frame 26 in the couch position.

The present invention further includes a method of converting a furniture frame 26 from the couch position to the bed position comprising the steps of: (1) raising the front end 42 of the seat section 28 to bring the backrest support member 32 into contact with the support surface 41; (2) further raising the front end 42 of the seat section 27 to displace the prop bar 44 from the catch member 43; (3) transferring partial support of the furniture frame 26 to the backrest support member 32; and (4) lowering the front end 42 of the seat section 28 so the seat support member 36 engages the support surface 41.

The above method can also include the step of (5) moving the backrest section 27 forward towards the seat section 28 to set the prop bar 44 in the first notch 45.